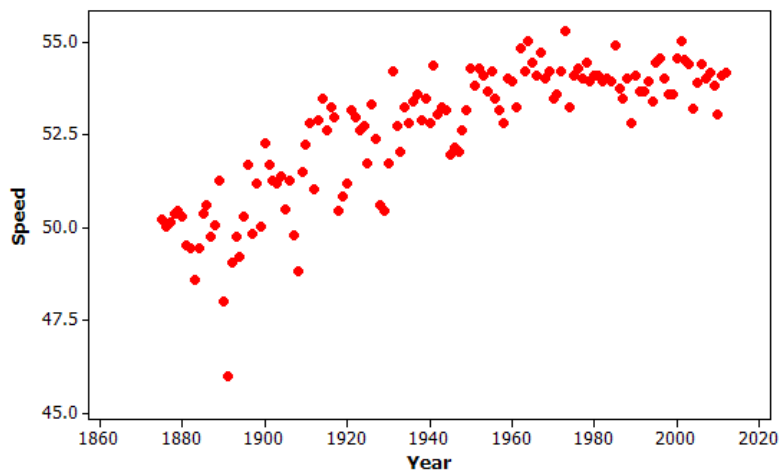


Name _____

Date _____

1. The Kentucky Derby is a horse race held each year. The following scatter plot shows the speed of the winning horse at the Kentucky Derby each year between 1875 and 2012.



- a. Is the association between *speed* and *year* positive or negative? Give a possible explanation in the context of this problem for why the association behaves this way considering the variables involved.
- b. Circle an outlier in this scatter plot and explain, in context, how and why the observation is unusual.

2. Students were asked to report their gender and how many times a day they typically wash their hands. Of the 738 males, 66 said they wash their hands at most once a day, 583 said two to seven times per day, and 89 said eight or more times per day. Of the 204 females, 2 said they wash their hands at most once a day, 160 said two to seven times per day, and 42 said eight or more times per day.

- a. Summarize these data in the two-way table below.

	MALES	FEMALES
≤ 1		
2-7		
≥ 8		
TOTAL		

- b. Calculate the relative frequencies for each category and gender and record them in the table below.

Table of Relative Frequencies

	MALES	FEMALES
≤ 1		
2-7		
≥ 8		

- c. Do these data suggest an association between gender and frequency of hand washing? Explain your answer using data from the relative frequency table in part b.

1. The scatter plots on the next 2 pages show different lines that students used to model the relationship between body mass (in pounds) and bite force (in pounds) for crocodiles.
 - a. Match each graph to one of the equations below and explain your reasoning. Let B represent bite force (in pounds) and W represent body mass (in pounds).

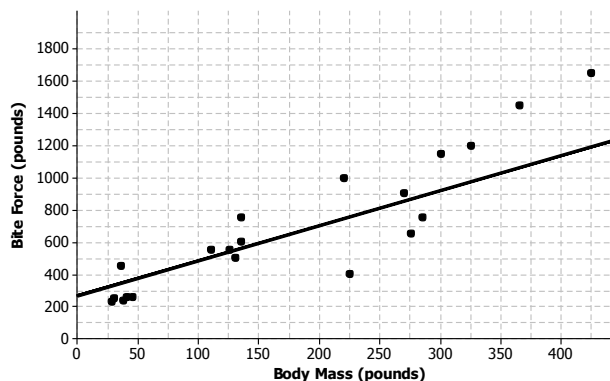
Equation 1
 $B = 3.28W + 126$

Equation 2
 $B = 3.04W + 351$

Equation 3
 $B = 2.16W + 267$

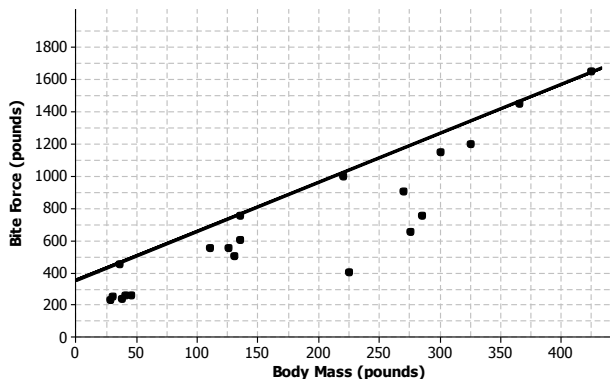
Equation:

Line 1

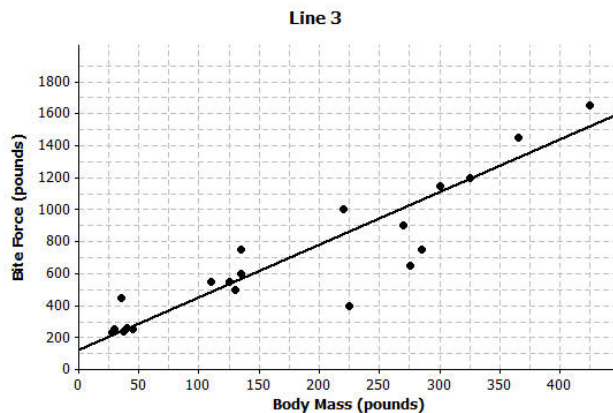


Equation:

Line 2



Equation:



b. Which of the lines would best fit the trend in the data? Explain your thinking.

2. Determine whether the statements below are true or false and explain your answer using an example.

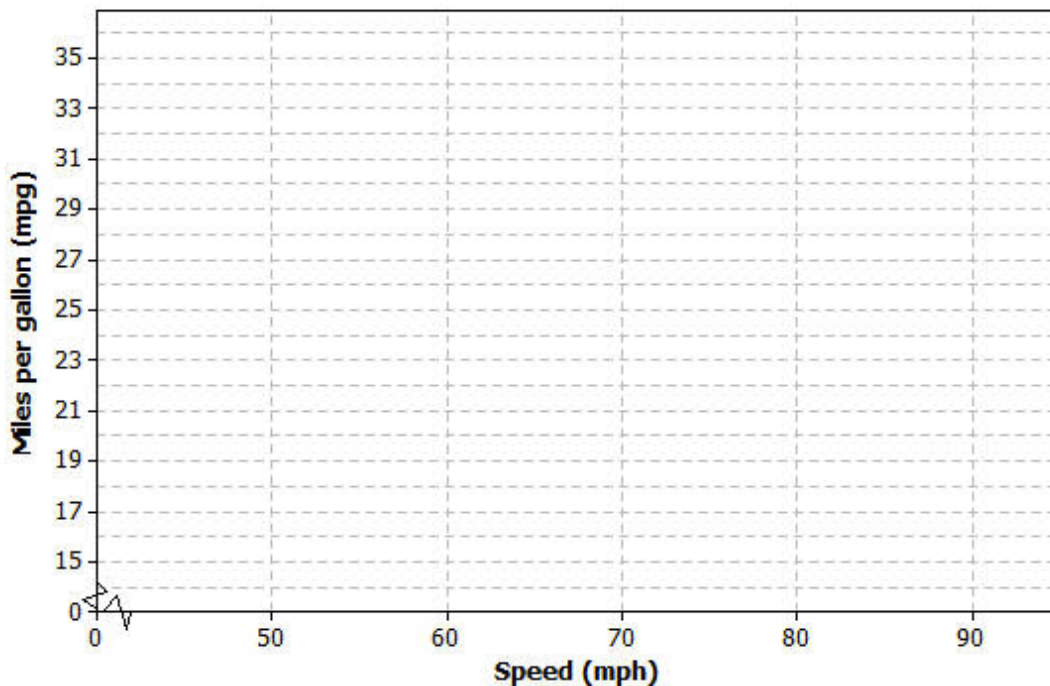
a. A line modeling a trend in a scatter plot always goes through the origin.

b. If the response variable increases as the independent variable decreases, the slope of a line modeling the trend will be negative.

1. To save money, drivers often try to increase their mileage, which is measured in miles per gallon (mpg). One theory is that speed traveled impacts miles per gallon. Suppose the following data are recorded for five different 300-mile tests, with the car traveling at different speeds in miles per hour (mph) for each test.

Speed (mph)	Miles per gallon (mpg)
50	32
60	29
70	24
80	20
90	17

- a. For the data in this table, is the association positive or negative? Explain how you decided.
- b. Construct a scatter plot of these data using the following coordinate grid. The vertical axis represents the miles per gallon (mpg), and the horizontal axis represents the speed in miles per hour (mph).



- c. Draw a line on your scatter plot that you think is a reasonable model for predicting the miles per gallon from the car speed.
- d. Estimate and interpret the slope of the line you found in part (c).

Suppose additional data were measured for three more tests. These results have been added to the previous tests, and the combined data are shown in the table below.

Speed (mph)	Miles per gallon (mpg)
20	25
30	27
40	30
50	32
60	29
70	24
80	20
90	17

- e. Does the association for these data appear to be linear? Why or why not?
- f. If your only concern was miles per gallon and you had no traffic constraints, what speed would you recommend traveling based on these data? Explain your choice.

